CLAIMS

1. A method for reducing DC offset associated with a receiver comprising the steps of:

(a) receiving a signal burst, r(n);

(b) storing said received burst samples, r(n), in memory;

(c) averaging said stored burst samples, r(n), and calculating an initial DC offset, A_0, from the stored burst samples;

(d) removing DC offset value from stored burst as follows: r(n) - A_0;

(e) estimating an updated DC offset, A_1, and a channel impulse response (CIR), $\hat{h}$, via a perturbed LS CIR estimation representation modeling received burst r(n) as follows:

$$r_j = \sum_{i=0}^{L-1} h_i t_{j-i} + f_j m + z_j$$

where h_i are CIR taps, t_j are known training sequence symbols, f_j is a generic function of j, m is static DC offset; and z_j is additive white Gaussian noise, and removing updated DC offset from stored burst as follows: r(n) $-A_0 - A_1$.

2. A method as per claim 1, wherein said function f_j satisfies the following conditions:

$$\sum_{j=L-1}^{25} f_j^H t_{j-k} \to 0, \forall k = (0,1,\ldots,L-1)$$, and

$$\frac{\sum_{j=L-1}^{25} f_j^H}{\sum_{j=L-1}^{25} \left|f_j\right|^2} - 1 \rightarrow 0$$

3. A method as per claim 1, wherein said receiver is an EDGE receiver.

4. A method as per claim 1, wherein said method for reducing DC offset is implemented in its entirety in a digital domain.

5. A method as per claim 1, wherein said function f_j is given by $f_j = \sum_p e^{\frac{i2\pi j}{k_p}}$, where p is the number of factors for the function and k_p is an integer.

6. An article of manufacture comprising a computer user medium having computer readable code embodied therein for reducing DC offset associated with a receiver, said medium comprising:

(a) computer readable program code receiving a burst signal, r(n);

(b) computer readable program code storing the received burst samples, r(n), in memory;

(c) computer readable program code averaging said stored burst samples, r(n), and calculating an initial DC offset, A_0, from the stored burst samples;

(d) computer readable program code removing DC offset value from stored burst as follows: $r(n) - A_0$;

(e) computer readable program code estimating an updated DC offset, A_1, and a channel impulse response (CIR), $\hat{h}$, via a perturbed LS CIR estimation representation modeling received burst r(n) as follows:

$$r_j = \sum_{i=0}^{L-1} h_i t_{j-i} + f_j m + z_j$$

where h_i are CIR taps, t_j are known training sequence symbols, f_j is a generic function of j, m is static DC offset; and z_j is additive white Gaussian noise, and removing updated DC offset from stored burst as follows: $r(n) - A_0 - A_1$.

7. A method for reducing DC offset associated with a receiver comprising the steps of:

(a) receiving a signal burst, r(n);

(b) storing said received burst samples, r(n), in memory;

(c) averaging said stored burst samples, r(n), and calculating an initial DC offset, A_0, from the stored burst samples;

(d) removing DC offset value from stored burst as follows: $r(n) - A_0$;

(e) identifying a rough timing estimate defining a position of largest channel impulse response (CIR) tap via cross-correlating stored bust data with a training sequence;

(f) performing fine CIR synchronization to identify taps to be added to said identified largest CIR tap;

(g) estimating an updated DC offset, A_1, and a CIR , $\hat{h}$, via a perturbed LS CIR estimation representation modeling received burst r(n) as follows:

$$r_j = \sum_{i=0}^{L-1} h_i t_{j-i} + f_j m + z_j$$

where h_i are CIR taps, tj are known training sequence symbols, f_j is a generic function of j, m is static DC offset; and z_j is additive white Gaussian noise, and removing updated DC offset from stored burst as follows: r(n) $-A_0 - A_1$.

8. A method as per claim 7, wherein said function f_j satisfies the following conditions:

$$\sum_{j=L-1}^{25} f_j^H t_{j-k} \rightarrow 0, \forall k = (0,1,\ldots,L-1)$$, and

$$\frac{\sum_{j=L-1}^{25} f_j^H}{\sum_{j=L-1}^{25} \left| f_j \right|^2} - 1 \rightarrow 0$$

9. A method as per claim 7, wherein said receiver is an EDGE receiver.

10. A method as per claim 7, wherein said function f_j is given by $f_j = \sum_p e^{\frac{i2\pi j}{k_p}}$, where p is the number of factors for the function and k_p is an integer.

11. A method as per claim 7, wherein said method for reducing DC offset is implemented in its entirety in a digital domain.

12. A communication system wherein information is transmitted through a channel having a discrete channel impulse response (CIR) to produce at an output of the channel, a signal, r_j, where:

$$r_j = \sum_{i=0}^{L-1} h_i t_{j-i} + f_j m + z_j$$

where h_i are CIR taps, t_j are known training sequence symbols, f_j is a generic function of j, m is static DC offset; and z_j is additive white Gaussian noise, such system comprising:

a receiver for receiving transmitted information, said receiver having a processor programmed to identify a DC offset estimate and a CIR estimate, said function f_j that reduces estimation error while keeping model mismatch error low, and said processor identifying said function f_j satisfying the following conditions:

$$\sum_{j=L-1}^{25} f_j^H t_{j-k} \rightarrow 0, \forall k = (0,1,\ldots,L-1)$$, and

$$\frac{\sum_{j=L-1}^{25} f_j^H}{\sum_{j=L-1}^{25} \left| f_j \right|^2} - 1 \rightarrow 0$$

13. The system of claim 12, wherein said receiver is an EDGE receiver.

14. The system of claim 12, wherein said function f_j is given by $f_j = \sum_p e^{\frac{i2\pi j}{k_p}}$, where p is the number of factors for the function and k_p is an integer.

15. An article of manufacture comprising a computer usable medium having computer readable program code embodied therein aiding a receiver in receiving transmitted information, said information is transmitted through a channel having a discrete channel impulse response (CIR) to produce at an output of the channel, a signal, r_j, where:

$$r_j = \sum_{i=0}^{L-1} h_i t_{j-i} + f_j m + z_j$$

where h_i are CIR taps, *tj* are known training sequence symbols, f_j is a generic function of j, m is static DC offset; and z_j is additive white Gaussian noise, such medium comprising:

computer readable program code identifying said function f_j that reduces estimation error while keeping model mismatch error low, and

said computer readable program code identifying said function f_j satisfying the following conditions:

$$\sum_{j=L-1}^{25} f_j^H t_{j-k} \to 0, \forall k = (0,1,\ldots,L-1)$$, and

$$\frac{\sum_{j=L-1}^{25} f_j^H}{\sum_{j=L-1}^{25} \left|f_j\right|^2} - 1 \to 0$$

16. An article of manufacture of claim 15, wherein said receiver is an EDGE receiver.

17. An article of manufacture of claim 15, wherein said function f_j is given by $f_j = \sum_p e^{\frac{i2\pi j}{k_p}}$ where p is the number of factors for the function and k_p is an integer.

18. An integrated circuit implemented in conjunction with a receiver in a communications system for reducing DC offset associated with said receiver, said integrated circuit comprising:

(a) an interface to receive a signal burst, r(n);

(b) memory to store said received burst samples, r(n);

(c) an averaging component to average said stored burst samples, r(n), calculate an initial DC offset, A_0, from said stored burst samples, and remove said initial DC offset value from stored burst as follows: $r(n) - A_0$;

(d) a perturbed LS CIR estimator to estimate an updated DC offset, A_1, and a channel impulse response (CIR), $\hat{h}$, via a perturbed LS CIR estimation representation modeling received burst r(n) as follows:

$$r_j = \sum_{i=0}^{L-1} h_i t_{j-i} + f_j m + z_j$$

where h_i are CIR taps, t_j are known training sequence symbols, f_j is a generic function of j, m is static DC offset; and z_j is additive white Gaussian noise, and removing updated DC offset from stored burst as follows: $r(n) - A_0 - A_1$.

19. An integrated circuit implemented in conjunction with a receiver in a communications system for reducing DC offset associated with said receiver, as per claim 18, wherein said receiver is an EDGE receiver.

20. An integrated circuit implemented in conjunction with a receiver in a communications system for reducing DC offset associated with said receiver, as per claim 18, wherein said function f_j is given by $f_j = \sum_p e^{\frac{i2\pi j}{k_p}}$, where p is the number of factors for the function and k_p is an integer.